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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/743,240	12/22/2003	Grant Hay	122055-4	6975

7590 07/05/2005

General Electric Company
CRD Patent Docket Rm 4A59
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EXAMINER

HON, SOW FUN

ART UNIT PAPER NUMBER

1772

DATE MAILED: 07/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/743,240

Applicant(s)

HAY ET AL.

Examiner

Sow-Fun Hon

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-27 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 15-27 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/22/03.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 15-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. (US 6,476,179) in view of Mitsubishi Chem Corp (Derwent 2002-409329).

Regarding claims 15, 20-21, Ito has a polycarbonate with transparency and dimensional stability used for optical devices (appliances) such as optical discs (column 4, lines 50-60). The polycarbonate comprises a bis(4-hydroxyphenyl)alkane (column 4, lines 50-60), one of which is bis(4-hydroxyphenyl)menthane (column 4, lines 35-45). 1,3-bis (4-hydroxyphenyl)menthane is the monomer which when polymerized yields the repeat unit of formula (I) in claim 1 (in Applicant's disclosure, page 14, Example 1). Ito gives 1,8-bis(4-hydroxyphenyl) menthane as an example of the bis(4-hydroxyphenyl) menthanes used in the polycarbonate (column 4, lines 35-45). 1,3-bis(4-hydroxyphenyl)menthane and 1,8-bis(4-hydroxyphenyl)menthane are chemical isomers because the two hydroxylphenyl substituents are at different positions on the menthane ring. The similarity in chemical structure and function entails the motivation of one skilled in the art to make a claimed compound, in the expectation that compounds

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similar in structure will have similar properties. See MPEP 2144.09. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used 1,3-bis(4-hydroxyphenyl)menthane in place of the 1,8-bis(4-hydroxyphenyl)menthane of Ito, in order to obtain the desired polycarbonate substrate properties.

Ito teaches a method for using a polycarbonate in an optical disc (column 1, lines 15-25). Ito fails to disclose the use of the polycarbonate comprising disposing a substrate made from the polycarbonate in an optical display device or a light-emitting device.

Mitsubishi Chem Corp teaches that a plastic substrate (sheet) with good dimensional stability (advantage section) is useful for an optical disc, an organic electric luminescent display panel (light-emitting device as defined by Applicant in claim 7) and a liquid crystal display panel (which is an optical display device as defined by Applicant in claim 6) (use section). Mitsubishi Chem Corp thus demonstrates the equivalency of an optical disc with a liquid crystal display device and an organic electroluminescent device as an optical device in which disposing a plastic substrate with good dimensional stability is useful.

Therefore, because Mitsubishi Chem Corp teaches that it is useful to dispose a plastic substrate with good dimensional stability in liquid crystal display (an optical display device as defined in claim 20) and an organic electroluminescent device (a light-emitting device as defined in claim 21) as well as an optical disk, and Ito teaches that the polycarbonate has good transparency and dimensional stability suitable for use in

optical devices such as an optical disc, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have used the polycarbonate comprising the chemical isomers of formula (I) of Applicant as taught by Ito, in a method for using a polymeric substrate comprising disposing said polymeric substrate in an optical display device or a light emitting device, as well as an optical disc, in order to obtain an optical device with the desired transparency and dimensional stability.

Regarding claim 16, in the bis(4-hydroxyphenyl)menthanes, R^7 and R^8 are hydrogen, m is 4 and q is 4 (there are 4 hydrogens on each of the two phenyl rings since each ring is only substituted at the 1 and 4 para positions).

Regarding claims 17-19, Ito teaches heat resistance, dimensional stability and transparency as properties of polycarbonate (column 1, lines 15-25). A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the chemical structure, the properties applicant discloses and/or claims are necessarily present. See MPEP 2112.01. The 1,3-bis(4-hydroxyphenyl)menthane polycarbonate is thus expected to have a glass transition temperature of greater than about 235 °C (claim 17), uniform thickness that varies less than about 3 % (claim 19), and haze less than about 4 % (claim 18).

3. Claims 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito in view of Mitsubishi Chem Corp, as applied to claims 15-21 above, and further in view of Hoshikawa (US 4,640,583).

Ito in view of Mitsubishi has been discussed above, and teaches a polycarbonate which comprises chemical isomers of formula (I) of Applicant wherein R^7 and R^8 are

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hydrogen, m is 4 and q is 4, wherein the polycarbonate substrate is disposed in a liquid crystal display device, but fails to teach that the polycarbonate substrate further comprises at least one barrier layer.

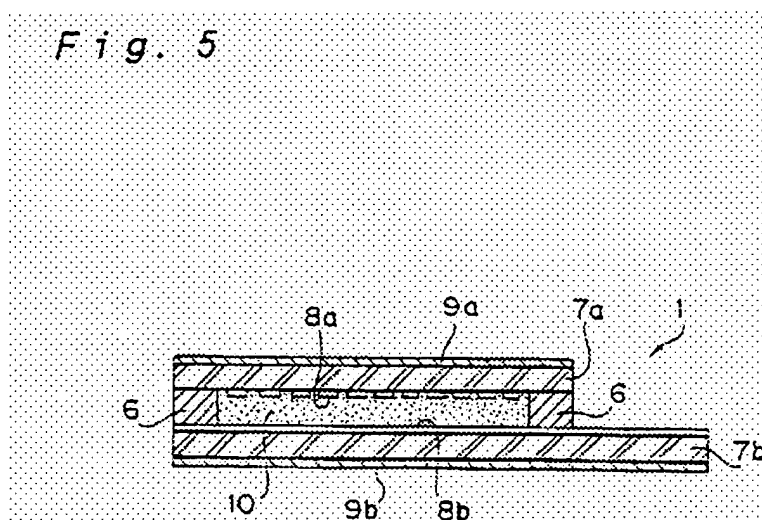
Hoshikawa teaches that the barrier layer 5 laminated on the substrates 10, 11, prevents moisture or air from invading the display medium (column 11, lines 35-45), and can be organic or inorganic (column 11, lines 60-65). The display medium can be liquid crystal or electroluminescent (column 16, lines 30-35). The substrate can be polycarbonate (column 4, line 55).

Therefore it would have been obvious to one of ordinary skill in the art to have disposed a barrier layer on the polycarbonate substrate of Ito in view of Mitsubishi, as an additional step to a method of disposing a polymeric substrate in an optical device, in order to obtain an optical display device or a light emitting device wherein the display medium is protected from moisture or air.

4. Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al. in view of Mitsubishi Chem Corp as applied to claims 15-21 above, and further in view of Imazeki et al. (US 5,847,782).

Ito in view of Mitsubishi has been discussed above, and teaches a polycarbonate which comprises chemical isomers of formula (I) of Applicant wherein R^7 and R^8 are hydrogen, m is 4 and q is 4, wherein the polycarbonate substrate is disposed in a liquid crystal display device, but fails to teach that the polycarbonate substrate further comprises at least one substantially transparent conductive layer comprising an oxide of indium oxide doped with tin.

Imazeki teaches that a typical liquid crystal display (column 1, lines 35-40) has a pair of transparent polymeric (plastic) substrates 7a and 7b substantially parallel to each other as seen in Fig. 5 below, transparent conductive layers (electrodes) 8a and 8b made of indium tin oxide, which is indium oxide doped with tin, disposed on a surface of each of said polymeric substrates, and a liquid crystal material 10 which contacts the transparent conductive layers (electrodes) 8a and 8b (column 3, lines 10-20).



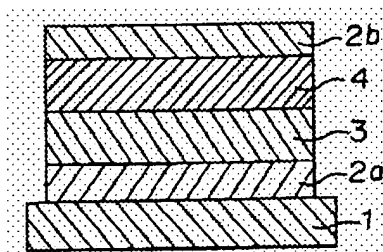
The substrates 7a and 7b are polycarbonate bases laminated with barrier layers which may be organic or inorganic (column 3, lines 25-35). The substrates 7a and 7b are planar (see Fig 5 above) and thus have a uniform thickness that varies less than 3%.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have disposed on the polycarbonate substrate of Ito in view of Mitsubishi, at least one transparent conductive layer comprising an indium tin oxide made of indium oxide and tin dopant, as taught by Imazeki, in order to provide electrical conduction for driving the display medium.

5. Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito in view of Mitsubishi Chem Corp as applied to claims 15-21 above, and further in view of Tashiro (US 5,059,863).

Ito in view of Mitsubishi has been discussed above, and teaches a method of using a polycarbonate substrate in which the polycarbonate comprises chemical isomers of formula (I) of Applicant wherein R^7 and R^8 are hydrogen, m is 4 and q is 4, wherein the polycarbonate substrate is disposed in an electroluminescent device, but fails to teach that the polycarbonate substrate further comprises at least one substantially transparent conductive layer comprising an oxide of indium oxide doped with tin.

Tashiro has an organic electroluminescent device which comprises a polymeric substrate made of a transparent polycarbonate (column 2, lines 40-50). Tashiro in Fig. 1 on the next page discloses that the layers of the laminate are planar. Thus the polymer substrate 1 has a uniform thickness that varies less than about 3%.



The polymeric substrate 1 comprises organic electroluminescent material layer 4 (column 4, lines 5-10) disposed between two electrodes (conductive layers 2a and 2b) (column 3, lines 20-25). Anode electrode 2a (column 3, lines 5-10) when transparent (column 2, lines 65-70) is indium tin oxide (column 27, lines 60-65) wherein the indium

oxide contains the tin dopant. Cathode electrode 2b comprises Sn (tin), Mg (magnesium), In (indium), Al (aluminum), Ag (silver) and alloys thereof (column 3, lines 10-20).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have disposed on the polycarbonate substrate of Ito in view of Mitsubishi, at least one transparent conductive layer comprising an indium tin oxide made of indium oxide and tin dopant, and other alloys containing magnesium, aluminum as taught by Tashiro, in order to provide electrodes for driving the display medium, with the desired balance of transparency and conductivity.

6. Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito in view of Mitsubishi Chem Corp as applied to claims 15-21 above, and further in view of Uchitsugu et al. (JPO Website Machine English Translation of JP 09-259640).

Ito in view of Mitsubishi has been discussed above, and teaches a method of using a polycarbonate substrate in which the polycarbonate comprises chemical isomers of formula (I) of Applicant wherein R^7 and R^8 are hydrogen, m is 4 and q is 4, wherein the polycarbonate substrate is disposed in an electroluminescent device, but fails to teach that the polycarbonate substrate further comprises at least one substantially transparent conductive layer comprising an oxide of at least one metal selected from the group consisting of tin, indium, zinc, gallium, and combinations thereof, and a dopant selected from gallium, germanium and tin.

Uchitsugu teaches a transparent conductive film formed on a plastic substrate (abstract), comprising an oxide of a metal selected from the group consisting of tin,

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indium, zinc [0002], gallium [0004], and a dopant selected from gallium [00012], tin and germanium [0009]. Cadmium is right below zinc in the same group of the Periodic Table, and is therefore expected to have similar properties. Aluminum is right above gallium in the same group of the Periodic Table, and is therefore expected to have similar properties. Uchitsugu teaches that these transparent conductive films are used as transparent electrodes for displays, wherein the different metals are combined to provide the desired transparency and electrical conductivity.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made, to have disposed on the polycarbonate substrate of Ito in view of Mitsubishi, a transparent conductive layer comprising an oxide of at least one metal selected from the group consisting of tin, cadmium, indium, zinc, gallium, and combinations thereof, and a dopant selected from the group consisting of gallium, aluminum, germanium and tin, in order to provide electrodes for driving the display, with the desired balance of transparency and conductivity.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number is (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached at (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (703)872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Hon

Sow-Fun Hon

06/15/05

[Signature]
HAROLD PYON

SUPERVISORY PATENT EXAMINER

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6/20/05